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A Report on the Itasca State Park Forest

With special reference to the desirability of opening or closing the Park to deer hunting.

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Itasca State Park is an area of very special interest and concern to the people of Minnesota. It contains four outstanding attractions which serve as the basis for its popularity not only to the people of Minnesota but to thousands of out-of-state visitors as well. These primary attractions are (1) the fact that the Park contains the source of the Mississippi River, (2) the presence of beautiful stands of primeval Norway and white pine forest in admixture with numerous lakes and ponds, and (3) the wildlife it harbors.

While different individuals may have different relative interests in these and other Park attractions, it is obvious from the great number of expressions of interest by Park visitors that most of them are particularly impressed by the beauty and inspiration of the virgin pine forests present at such spots as Preachers' Grove, the east side of Mary Lake, the main Park entrance road, Elk Springs and elsewhere throughout the Park.

The primary function of Itasca Park is to furnish recreational opportunities appropriate to its special attractions. Among the more important are simple enjoyment of peaceful and beautiful surroundings, camping, hiking, exploring, picnicing, photography, nature study, fishing, boating and swimming. In addition, however, it provides unusual and increasingly significant educational and research opportunities in the general area of natural resources, forest biology and conservation. A fine program of natural history education is currently provided through the Park naturalist. The University of Minnesota Forestry and Biological Station is maintained in the Park and provides summer field training for foresters, wildlife majors and biologists in general. A considerable program of research is conducted by both students and staff of the University as well as by visiting scientists from other educational institutions. In addition, Douglas Lodge and the University's Forestry and Biological Station serve as a place for numerous group meetings where it is desirable to be near and have access to the forests, waters and wildlife available in the Park.

It is expected that future demands upon the Park will increase greatly. This will result from the normal increase in tourist travel following more leisure time, better travel facilities, greater populations, and increased human longevity. It will be swelled even further by the completion of the Mississippi River Parkway system which is now in initial stages of development.

The Forest of Itasca Park

The great popularity and wide usage of Itasca Park as a recreational, educational and research center and the critical importance of the Park forest, particularly the old growth pine stands, in this connection focuses attention on the present condition of the forest vegetation and what is happening to it. Furthermore, the Law of 1907, Chapter 90, which provides for the care and

management of the Park makes special reference to the preservation of the "primeval pine forest." The welfare of this forest is therefore both an official responsibility of the State Department of Conservation and also a matter in which the general public, forestry and biological educators, scientists and others are seriously concerned.

A survey conducted in 1952 by the University of Minnesota School of Forestry in cooperation with the State Conservation Department furnishes the data for the general summary in Table I of acreages present in the different forest types.

Table I

Type Acreages in Itasca State Park

Forest Type	Total Acreage
Aspen	13,268
Norway pine	5,738
Jack pine	1,898
Spruce-balsam	1,637
Marsh and bog	1,563
Northern hardwoods	1,513
White pine	847
Lowland brush	579
Lowland hardwoods	374
Upland brush	370
Tamarack	306
Spruce	201
Lakes	3,114
Fields and roads	205
Total	31,586

From this table it appears that the total area of Norway and white pine, the forest types of critical importance as a basic attraction in the Park, is approximately 6,586 acres or less than 20 per cent of the total area. It is also pertinent to note the condition of these acres devoted to the Norway and white pine types as shown in Table II.

Table II

Area in Acres by Condition Classes

Forest Type	Overmature 1/	Mature 2/	Young 3/	Total
Norway pine	2537	2908	293	5738
White pine	739	108	---	847

1/ Trees over 200 years old with an average life expectancy of 25 years.
2/ Trees mostly 90 to 150 years old.
3/ Trees mostly 50 to 75 years old.

These data indicate a serious absence of the younger age classes in the forest and a disturbing concentration of overmature trees which cannot be expected to last much more than about 25 years. As these acres revert to other less desirable forest types such as mixed hardwoods, brush and balsam, the value of Itasca Park as a tourist attraction will suffer greatly unless there is a sufficient acreage of young pine growth to replace it.

Some idea of the rate at which this old growth pine is being lost to insects, disease and especially to windthrow is shown in the following official record of old growth pine timber salvaged as dead or windthrown trees since 1940.

Table III

Summary of Volumes of Old-growth Pine Timber Sold as Salvage of Dead and Down Trees at Itasca State Park from 1941 to 1955

Period	Volumes (bd. ft.)
1941-43 inclusive	470,780
1944-46 inclusive	848,320
1947-49 inclusive	823,880
1950-52 inclusive	1,053,597
1953-55 inclusive	1,224,880

It is obvious from these data that the rate of mortality in this forest type is becoming very serious. There is a very sharp increase in the rate of salvage since 1940. With the passage of time and the increasing over-maturity of the trees there is every reason to expect this general trend to continue.

The reasons for the almost complete absence of young pine stands are several. The origin of the present stands was largely associated with fire. Because of the inherent regeneration characteristics of Norway pine it appears to restock itself best following certain types of burning. Since fires have been controlled for obvious reasons since the creation of the Park in 1891, optimum regeneration conditions have not existed.

A second factor accounting for the almost complete absence of young pine for a period of about 25-30 years preceding 1945 was the excessive deer population which existed on a starvation basis during that time. Browse damage was so heavy that no pine seedlings were able to survive above snow level. This condition was relieved in 1945 by action of the legislature in making an open season on deer possible in Itasca Park.

A third major reason for the scarcity of pine regeneration, especially Norway pine, is the great abundance of upland brush present on almost all of the acreage in the aspen type, on most of the Norway and white pine acreage, and on much of the jack pine area as well as that covered by mixed hardwoods and other minor types. The history of this brush population build-up and the factors affecting it are not entirely clear and are now the subject of special investiation by the School of Forestry in cooperation with the Iron Range Research and Rehabilitation Commission.

It has, however, been definitely shown by permanent plot records covering a nine-year period after the deer season was opened that with the deer browsing greatly reduced, pine areas on which there was no serious brush problem could regenerate with an abundance of white and jack pine seedlings. These records (see Table IV) indicate that the population of such seedlings is, on such areas, very encouraging. It should be emphasized, however, that these are areas on which brush is not a serious problem.

Table IV

Summary of White and Jack Pine Reproduction in a Reasonably Brush-free Jack Pine Stand in Itasca State Park During a Nine-Year-Period Following the Opening of the Park to Deer Hunting

	Number of seedlings reaching five years of age or more	
Year	White pine	Jack pine
1947	29	---
1948	780	208
1949	2208	1212
1950	1261	975
1951	3020	803
1952	3218	1025
1953	4090	1645
1954	5459	1820
1955	3920	1694

Further evidence of the seriousness of excessive deer browse damage to young pines can be furnished by counts of pine seedlings (Norway and white) taken inside and outside of the Mary Lake deer exclosure and summarized for a seven-year-period after 1945 in Table V.

Table V

Number of Norway and White Pine Seedlings per Acre Inside and Outside of the Mary Lake Deer Exclosure 1946-1952

Year	Number seedlings per acre	
	in	out
1946	599	0
1948	1190	50
1950	930	73
1952	1225	375

From this Table it is evident that while an appreciable seedling population existed within the deer exclosure, none were present outside the area protected from deer browse until 1948 when a small number established. It is also evident that this number substantially and steadily increased by 1952.

While this encouraging increase in pine seedling establishment is evident in several brush-free areas such as those cited, it was felt desirable to determine more generally what the reproduction picture was within Itasca Park. The data cited in summary form in Table VI report the results of a reproduction survey conducted by the writer during the summer of 1955 and covering 1103 widely distributed plots in the four major forest types as listed. In addition, the average heights of the seedlings was also determined and is reported in Table VII.

Table VI

	Average density of stocking (number of seedlings per acre)		
	all species	all conifers	pine only
Old growth Norway and white pine	1254	370	263
Old growth Jack pine	766	365	330
Aspen	1170	90	90
Spruce-fir	3255	2235	13

Table VII

Average Height of Regeneration Within the Major Forest Types in Itasca State Park

Forest Type	Aspen and birch	All pine species	Spruce and fir
Norway and White pine	over 5'	1'	1'-2'
Jack pine	over 5'	1'-2'	2'
Aspen	over 5'	1'-2'	none
Spruce-fir	4'	1'	1'

From Table VI it is evident that while there is scattering of young pine coming in on several of the types, it is not yet adequate to restock such areas when the old growth blows down. By contrast with the complete lack of pine seedlings before 1945, however, it indicates an encouraging response following the reduction of browse damage after 1945.

Data in Table VII show that the average height of pine seedlings is less than two feet on all major forest types and only one foot on the Norway and white pine types as well as the spruce-fir stands. These seedlings are still far too small to be safe from deer browsing damage. The normal pattern of height growth in young coniferous seedlings is usually one of very slow growth for the first 5 to 15 years after which their growth accelerates sharply if they have adequate light.

It should be emphasized that a casual, roadside survey of reproduction reveals a picture of pine regeneration which is not at all typical of the situation only a few yards removed from the roads. Because of the favorable conditions of light as well as the exposure of mineral soil, seedlings come in far more abundantly along roadside ditches and shoulders and grow far more rapidly than they do under the shade of an overstory of old trees and brush. Many roadsides now have an abundance of pine seedlings over three feet in height. However, within the forest only a few such seedlings can be found, and they are only about one foot in size.

Recommendations

The interst of the public in seeing deer in abundance in Itasca Park is recognized. It is also recognized that the public has a major interest in the protection of the pine forest constituting a major attraction in Itasca State Park. Furthermore, the present generation has a legal and moral responsibility indicated by the Law of 1907 to maintain and preserve pine stands.

In view of this it is felt that a deer population should be maintained as large as is consistent with the protection of the forest vegetation and particularly the pine seedlings which will replace the old growth pine stands which are rapidly becoming decadent.

Inasmuch as 10 years have passed since the Park was opened to deer hunting, it was felt that some estimate should be made of the extent of recovery of the forest from the excessive browsing which had seriously interfered with the normal development of many of the forest types during the 25-30 year period preceding 1945. This report contains the results of such a survey conducted in August, 1955 by the School of Forestry at the University of Minnesota Forestry and Biological Station.

In general the survey indicates that a favorable response in terms of forest regeneration resulted from the reduction of the deer population after 1945. However, the serious damage done in the earlier years cannot be repaired in a short period of 10 years. The density of restocking of the desirable pine species is far from adequate. In addition, the pine seedlings which have resulted now average only one to two feet in height and will clearly not be safe from deer browse in the event of a population increase.

It is felt that the conditions clearly indicate that a continuance of an open season on deer as is now the policy is in the best interests of Itasca State Park and in safeguarding the scenic attractions constituting its greatest appeal.